



INDIANA DEPARTMENT OF TRANSPORTATION

Driving Indiana's Economic Growth

Design Memorandum No. 08-15 Technical Advisory

July 25, 2008

TO: All Design, Operations, District Personnel, and Consultants

FROM: /s/ Anthony L. Uremovich
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SUBJECT: Minimum Pile Length and Integral End Bents

REVISES: *Indiana Design Manual* Sections 66-3.03 and 67-1.0

EFFECTIVE: For Maximum Pile Length,
Request for Geotechnical Report After Date of This Memorandum
For Integral End Bents,
Start Plan Development After Date of This Memorandum

I. Minimum Pile Length

The minimum pile length should be that shown in Figure 08-15A, below.

| Pile Size | Minimum Length, ft (m) | |
|-----------|------------------------|---------|
| | Clay | Sand |
| HP 10 | 30 (9) | 25 (8) |
| HP 12 | 35 (11) | 25 (8) |
| HP 14 | 40 (12) | 30 (9) |
| CFT 14 | 50 (15) | 35 (11) |

MINIMUM PILE LENGTH

Figure 08-15A

If the minimum length shown in Figure 08-15A cannot be attained, the designer must provide calculations to support the use of a shorter length.

II. Pile Embedment into Integral-End-Bent Cap

The embedment of piles into the cap should be 24 in. (600 mm). *Indiana Design Manual* Figures 67-1B and 67-1C have been revised to reflect this, and are attached hereto. The embedded portion should not be wrapped with polystyrene.

III. Maximum Length of Bridge with Integral End Bents

The maximum length of an empirically-designed integral-end-bents bridge should be as shown in Figure 08-15B, below. This figure supersedes *Indiana Design Manual* Figure 67-1A.

| Structure Type | Highway Alignment Across Bridge | Maximum Skew | Maximum Bridge Length | Maximum to Zero Point |
|--------------------------|---------------------------------|-----------------|-----------------------|-----------------------|
| Reinforced Concrete Slab | No Restrictions | No Restrictions | 500 ft (150 m) * | 250 ft (75 m) * |
| Structural Steel | Tangent Only ** | 30 deg *** | 500 ft (150 m) * | 250 ft (75 m) * |
| Prestressed Concrete | No Restrictions | 30 deg *** | 500 ft (150 m) * | 250 ft (75 m) * |

Notes:

* *The maximum length indicated may be increased, subject to approval by the Structural Services Office manager, if a rational analysis of induced pile loads indicates that the piles are not overloaded. Two rational analysis methods are described in the Iowa Department of Transportation report, Pile Design and Tests for Integral Abutment Bridges. See Indiana Design Manual Section 67-1.03(03) for an alternative analysis in lieu of the above criteria.*

** *The horizontal alignment may be curved as long as curved beams are not used.*

*** *A skew of greater than 30 deg but equal to or less than 45 deg will be permitted if the maximum bridge length does not exceed 250 ft (75 m), or if the maximum to zero point does not exceed 125 ft (37.5 m).*

USE OF INTEGRAL END BENTS

Figure 08-15B

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Attachments

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